The Fourteenth Law of Inward Physics

Resonant Boundary Selection in Completed Systems

Daniel Jacob Read IV
ĀRU Intelligence Inc.
Corvallis, Oregon, USA
ORCID: 0009-0000-6133-1872
office@aruintelligence.com

March 2026

Abstract

Completion within the framework of Inward Physics introduces a structural requirement beyond identity conservation alone. Once identity invariants are established for completed systems, environmental interaction becomes a critical stability problem. If external perturbations couple freely to a coherent system, the conserved structure that defines identity can be destabilized.

This paper establishes that completed systems regulate environmental interaction through resonance-selective boundary operators. Only signals compatible with the system's unity carrier configuration and satisfying reciprocity constraints can couple across the system boundary without violating the identity invariant. Resonant boundary selection therefore acts as the structural mechanism that preserves identity conservation within a dynamically interacting field environment.

1 Introduction

Inward Physics describes coherent systems as configurations stabilized through registration within a scalar memory-density field

$$\mu(x, t)$$

whose integrated density determines system persistence.

Previous laws establish the emergence of coherence, the stabilization of identity, and the closure of completed systems. Once temporal succession is removed from the framework, identity must be governed by a conserved invariant rather than assumed continuity.

However, identity conservation alone does not guarantee stability. Completed systems remain embedded within an environment capable of exerting influence. Without a mechanism regulating which signals may interact with the system, perturbations could destabilize invariant structure.

Therefore the theory must address a second structural requirement: boundary regulation.

2 Environmental Interaction

Environmental influence acting upon a system may be represented by a spectral distribution

$$S_E(\omega)$$

where ω denotes frequency components of incoming signals.

If environmental signals were allowed unrestricted coupling to a coherent system, several destabilizing effects would arise:

- identity invariant drift
- structural destabilization
- adversarial resonance injection
- substitution through coherent mimicry

Identity conservation therefore requires selective boundary coupling.

3 Unity Carrier Frequency

Each coherent system stabilizes around a characteristic carrier frequency

$$\Omega^*$$

representing the dominant oscillatory structure of its internal dynamics.

System coherence is described by an order parameter

$$R \in [0, 1]$$

where

$$R \to 1$$

indicates maximal internal synchronization.

As coherence increases, internal system dynamics concentrate increasingly around the unity carrier frequency.

4 Boundary Operator

The boundary between a coherent system and its environment acts as a frequency-selective coupling operator.

Let the boundary operator be defined as

$$\mathcal{B}(\omega)$$

which determines the probability that an incoming signal couples to the internal configuration.

The boundary transmission function is

$$T(\omega) = G\,\rho\,f_R(\omega - \Omega^*)$$

where the resonance function is defined as

$$f_R(\Delta) = \exp\left(-\frac{\Delta^2}{2\sigma_R^2}\right)$$

and the resonance bandwidth satisfies

$$\sigma_R \propto (1 - R).$$

The parameter G represents intrinsic boundary permeability and ρ represents reciprocity between the external signal and the internal field structure.

5 Resonant Passband

The resonance function f_R defines the spectral passband through which signals may enter the system.

Signals satisfying

$$|\omega - \Omega^*| \ll \sigma_R$$

have high transmission probability, while signals outside this band experience rapidly decreasing transmission.

As coherence increases, the passband width narrows, strengthening boundary selectivity.

6 Effective Coupling Flux

The environmental influence entering the system may be expressed as

$$\Phi_{\text{eff}} = \int_{-\infty}^{\infty} T(\omega) S_E(\omega) d\omega.$$

This effective flux represents the portion of environmental information capable of integrating into internal system dynamics.

Signals lacking resonance alignment contribute negligibly to this coupling.

7 Identity Invariance

Completed coherent systems preserve structural persistence through an identity invariant

$$\frac{dI}{d\tau} = 0.$$

External perturbations that violate resonance conditions introduce structural variance and threaten identity preservation.

Resonant boundary filtering therefore acts as a stabilizing constraint ensuring invariant conservation.

8 The Fourteenth Law

The Fourteenth Law of Inward Physics is therefore stated as follows:

> **Law XIV — Resonant Boundary Selection**
>
> Influence may couple to a completed coherent system only when its spectral structure aligns with the system's unity carrier frequency and satisfies reciprocity conditions with the internal configuration. Non-resonant influence is rejected by the system boundary to preserve the identity invariant.

Thus the boundary of a coherent system functions not as a rigid barrier but as a resonance-selective filter that admits compatible influence while rejecting destabilizing signals.

9 Failure Modes Without Boundary Regulation

Without resonance-selective boundaries, completed systems would experience structural instability including:

- invariant drift through cumulative perturbation
- destabilization through incompatible signals
- adversarial resonance injection
- identity substitution through engineered mimicry

The Fourteenth Law therefore acts as the necessary extension of identity conservation.

10 Conclusion

The Fourteenth Law establishes that coherent systems regulate environmental interaction through resonance-selective boundaries.

By admitting only compatible signals while rejecting destabilizing perturbations, these boundaries preserve identity invariance while maintaining openness to structurally aligned influence.

Resonant boundary selection therefore represents a fundamental mechanism through which coherent systems maintain stability within the memory-density field.

11 References

Read, Daniel Jacob IV (2026). *The Memory Field Paradigm: A Unified Framework for Inward Physics.*

Read, Daniel Jacob IV (2026). *Experimental Roadmap for Inward Physics.*